

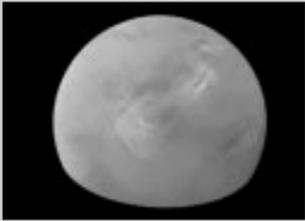
Space News ROUNDUP!

VOL. 37 NO. 6

Lyndon B. Johnson Space Center, Houston, Texas

March 27, 1998

In this issue



Mars Global Surveyor sees Atlantic Ocean-sized dust storm.

Page 2



JASON project lets students get deep into their studies of underwater life.

Page 3



The NeuroLab mission will look at how the brain functions in microgravity.

Page 4



Twenty-six years ago, Scott Carpenter replaced Deke Slayton on Mercury-Atlas 7.

Page 6



Safety, Reliability and Quality Assurance loosens up for reorganization.

Page 7



Television's Vanna White pays JSC a visit during promotional tour.

Page 8

New program brings JSC news to workstations

By Mike Garren

Starting Monday, JSC will have a new mechanism for spreading news throughout the center over its computer networks.

Called NASA News, or NNews, the new system is a virtual screen saver bulletin board similar to the commercially developed PointCast, that is linked to the center's web sites. The NNews Project originated as an action from the Executive Safety

Committee to enable the delivery of general safety information to all employees, to spread information of an emergency nature such as weather warnings in a speedy manner, and to deliver information of centerwide interest in a way that doesn't require employees to find it on their own.

The application was developed in-house by Charles Salkowski, chief of Engineering's Manufacturing and Process Development Branch, originally

as a way to disseminate metrics within his organization. Salkowski and the safety committee soon realized that with little modification the system could be used to meet the challenge of developing the emergency broadcast system features.

As a screen saver or as an application employees will have the center's Safety Alerts and JSC News at their fingertips. In the works are a revised form of The Daily Cyber

Space Roundup, JSC weather, plus current news published by each organization that has elected to do so.

As NNews users, employees may choose the organization news to view down to the two-letter organization code, provided that organization is publishing information. For example, users may choose to receive only their own organization's news or a combination of different organizations'

Please see **NEWS**, Page 8



NASA Photo by Karla Thomas

The X-38 atmospheric test vehicle kicks up dust as it lands in the Mojave Desert following its first unpowered flight test on March 12. The test concentrated on the use of the X-38's parafoil parachute, which deployed as planned within seconds after the vehicle's release from the B-52 and guided the test craft to landing.

X-38 completes first flight with gentle landing

By James Hartsfield

Development of the X-38, an innovative new spacecraft design planned for use as a future International Space Station emergency crew return "lifeboat," passed a major milestone on March 12 with a successful first unpowered flight test.

The first X-38 atmospheric test vehicle was launched from under the wing of NASA's B-52 aircraft at the Dryden Flight Research Center, Edwards, Calif., at 10:30 a.m. CDT and completed a descent from a 23,000 foot altitude at 10:38 a.m. The test focused on the use of the X-38's parafoil parachute, which deployed as planned within seconds after the vehicle's release from the B-52 and guided the test craft to landing, the softest so far in the development test series.

"This was a real experimental flight test," X-38 project manager John Muratore said. "No one had ever tried to do anything like this before. Through ground and flight test we tried to reduce or eliminate

all of our risk, but in the end, we had to prove the concept through full-scale flight. We proved the basic concept on the first flight and on the next 19 flights we will refine the concept to prove we are ready to bring the X-38 back from space."

Atmospheric drop tests of the X-38 will continue for the next two years using three increasingly complex test vehicles. The drop tests will increase in altitude to a height of 50,000 feet and include longer flight times for the test craft prior to deployment of the parafoil. In 2000, an unpowered space test vehicle is planned to be deployed from a space shuttle and descend to a landing. The X-38 crew return vehicle is targeted to begin operations aboard the International Space Station in 2003.

"The X-38 is the first JSC X-vehicle and the first vehicle ever built at JSC," Muratore added. "This was a real team effort—every organization on the center made some contribu-

Please see **X-38**, Page 8

College students fly experiments on KC-135

Forty-eight teams of undergraduate college students from around the country are "floating" through school this month aboard a NASA research aircraft.

The teams are here for the 1998 NASA Reduced Gravity Student Flight Opportunities program, funded by NASA and administered by the Texas Space Grant Consortium, Austin.

Each team consists of up to four undergraduate-level college stu-

dents, a supervising professor and a professional journalist. All team members, except the supervising professor, have the opportunity to fly.

Teams are flying experiments aboard NASA's KC-135A aircraft that uses a roller-coaster-like flight profile over the Gulf of Mexico to provide brief periods of microgravity. Each team will fly twice, and each flight will include approximately 40 parabolic arcs. During each two-to-three-hour flight, passengers and

their experiments can experience about 25 seconds of zero-gravity.

This year's teams are divided into two groups: Group A arrived March 16, and Group B arrived March 23. During the first week, participants received pre-flight training, and assembled and tested their experiment packages.

During the second week, they flew with their experiments, adjusted their equipment, and conducted post-flight reviews.

In addition to performing the experiments, each team developed a program for sharing research results with teachers, students, and the general public after the flights.

Participants will analyze their data, prepare educational or informational materials, and submit final reports.

A list of the selected teams and additional information about the program can be found on the Internet at the following address: <http://www.tsgc.utexas.edu/tsgc/floatn/>

Node 1 passes critical leak check in Florida

Node 1, the first U.S.-built International Space Station element, last week passed with flying colors a key test of its functional readiness for launch.

The two-week-long pressurized leak test, which ended March 18, confirmed that the more than 170 seals on the connecting passageway to the living and working areas of the space station are tight and ready to support human inhabitants.

"The successful completion of the Node element leak test is a significant milestone for the 2A team," said Bill Bastedo, manager for Launch Package 2A, which will go aloft aboard the Space Shuttle *Endeavour* later

this year. "We have now successfully leak tested Pressurized Mating Adapters-1 and 2 as well as Node 1 and all three have performed much better than specifications call for."

The test followed the removal of Node 1 from the element rotation test stand for an interim weight and center of gravity determination.

The leak check took place behind the closed doors of the shuttle payload transportation canister in Kennedy Space Center's Space Station Processing Facility. The node was pressurized with a combination of helium and air. Then, the interior of the canister was monitored for any

Please see **LEAK**, Page 8



NASA Photo

Technicians in Kennedy Space Center's Space Station Processing Facility prepare Node 1 and Pressurized Mating Adapters 1 and 2 for a leak test that verified its ability to support human habitation.

Vitamin a day can be harder to take than it sounds

U.S. Astronaut Andy Thomas and his Mir 25 crew mates spent the last two weeks unloading shipments of food, water and supplies to the Russian space station and prepared for a series of space walks in the month of April.

Thomas, who passed the midway mark of his four-month research flight as the final U.S. astronaut to live and work on the outpost, said in a televised interview that he's adjusted to his new environment but that living without gravity is a continual challenge.

"You have to learn to change the way you live and what your expectations of your day-to-day life are, because you don't have access to the normal recreational kinds of activities that you might have on the ground. And you don't have access to all your social networks and people. So you change the way you live to accommodate that," Thomas said, then related one humorous incident.

"I take a vitamin every day, just as a multi-vitamin supplement," he explained. "I opened the vitamins, and of course I just had a cloud

of vitamin pills well up in front of me. You can imagine the sort of Three Stooges-type view of trying to grab them out of space and get them back in the bottle. And as quickly as I'd get them in, more would come out. That's one of the things about learning to live and function in zero gravity. The rules are all different."

A new Progress resupply ship docked with Mir on March 16, two days after its launch from the Baikonur Cosmodrome in Kazakhstan. As it headed for Mir, Commander Talgat Musabayev and Flight Engineer Nikolai Budarin jettisoned the old Progress ship from the Kvant-1 module's docking port to free it up for the arrival of the new Progress.

"It was seamless, beautiful piece of work," Thomas reported. "The docking was very smooth. We felt a slight nudge and a shudder in the station as the docking took place and as

the systems latched together. The commander executed the work flawlessly."

Once the new Progress was in place, the three crew members began to unload its contents and geared up for the first of three planned excursions outside Mir by Musabayev and Budarin to replace the fuel supply in a boom assembly rising from Kvant-1 called the Sofora tower. It has been used since 1987 to provide some attitude control for the Mir, but with its fuel supply dwindling, Russian flight controllers elected to replenish the fuel and perform other maintenance work on the boom itself.

The first space walk associated with the boom assembly tasks is scheduled for April 1. Around April 20, Musabayev and Budarin will conduct another space walk to strengthen the damaged solar array mast on the Spektr module that bore the brunt of the collision between a Progress vehicle and the Mir last

June. The two Russians plan to install additional struts to the array.

That space walk had been scheduled earlier this month, but was postponed when Musabayev and Budarin failed to release a latch holding the Kvant-2 airlock hatch tightly shut. They broke a pair of tools trying to free up the latch and called off the space walk, but later released the latch.

Thomas is pressing ahead with a variety of scientific experiments in the final weeks of his mission. He and his crew mates planned to celebrate the second anniversary of a continuous U.S. presence on Mir on March 24, the day in 1996 when astronaut Shannon Lucid arrived on Mir to begin an unbroken series of Americans on the complex.

Thomas is due to return to Earth in early June aboard *Discovery* to close out the Phase 1 Program. Later this year, assembly of the International Space Station is scheduled to begin with permanent occupancy of the new facility planned in early 1999.



NASA works on satellite to view Earth

Keying off a concept proposed by Vice President Al Gore, NASA is developing plans for a small satellite that could provide continuous views of the Earth by the year 2000.

NASA plans to issue educational, scientific and possibly commercial announcements of opportunity within the next few weeks, following the Vice President's call March 13 for NASA to design, build and launch the satellite by 2000.

"Vice President Gore has given us an exciting challenge," said NASA Administrator Daniel S. Goldin. "In the coming weeks, we plan to solicit ideas from the academic, environmental, scientific and commercial communities. We will synthesize these ideas and communicate with the Congress as we go forward."

Goldin said NASA envisions "down-to-Earth" applications: "This view of our planet can help us plan as fires ravage wilderness areas, it may be able to save lives as we watch hurricanes and typhoons form and threaten coastlines across the grand sweep of ocean basins. Moreover, we think it is important to inspire young minds, provide new perspectives on the planet for our scientific community, and perhaps provide commercial applications as well. We're going to pave the way for an Earth Channel."

The satellite concept would place a high definition television camera—paired with an eight-inch telescope—into an orbit at a unique vantage point a million miles from Earth where it could provide 24-hour views of the home planet. It would orbit at a point in space where the gravitational attraction of the Sun and the Earth essentially cancel one another, allowing the satellite to constantly view a fully sunlit hemisphere.

Early plans envision a 330-pound satellite linked to Earth through three simple, low-cost ground stations equally spaced around the globe to provide continuous downlink capability. One new image would be downlinked every few minutes. Total cost would not exceed \$50 million.

New Global Surveyor data reveal genesis of Martian dust storm

For the first time in Mars exploration, a spacecraft has captured the full evolution of a Martian dust storm.

NASA's Mars Global Surveyor also has returned new insights into the deeply layered terrain and mineral composition of the Martian surface, and to highly magnetized crustal features that provide important clues about the planet's interior.

These findings are among the early results from the Mars-orbiting mission being reported in the March 13 issue of *Science* magazine.

This first set of formal results comes from data obtained in October and November 1997, while the spacecraft was just beginning to use the drag of Mars' upper atmosphere to lower and circularize its highly



The Space Shuttle *Columbia* is transferred from Orbiter Processing Facility Bay 3 to the Vehicle Assembly Building, where it was mated to its external tank and solid rocket boosters last week. *Columbia* is being prepared for the STS-90 mission, carrying the Neurolab payload.

Columbia rolls to launch pad

By Ed Campion

Following rollout to Launch Pad 39B earlier this week, final vehicle and payload operations are under way for the launch of *Columbia* on the STS-90 Neurolab mission.

Columbia's arrival at the launch pad followed its transfer from the Orbiter Processing Facility to the Vehicle Assembly Building on March 16 where it was mated to its solid rocket booster/external tank set.

During the removal of the orbiter sling following hardmate of *Columbia* to its external tank, the aft sling contacted the orbiter near the left aft attach point and slightly scuffed the thermal blanket material in that area. Technicians removed some blankets and tiles in order to inspect the subsurface area and found no structural damage.

Shuttle interface testing then resumed and the scuffed blanket area was removed and replaced with new material. The extra inspection work did not significantly affect VAB operations and *Columbia* was able to rollout as scheduled.

Early next week, STS-90 Commander Rick Searfoss, Pilot Scott Altman, Mission Specialists Rick Linnehan, Kay Hire and Dave Williams and Payload Specialists Jay Buckley and James Pawelczyk will be at Kennedy Space Center to participate in the Terminal Countdown Demonstration Test.

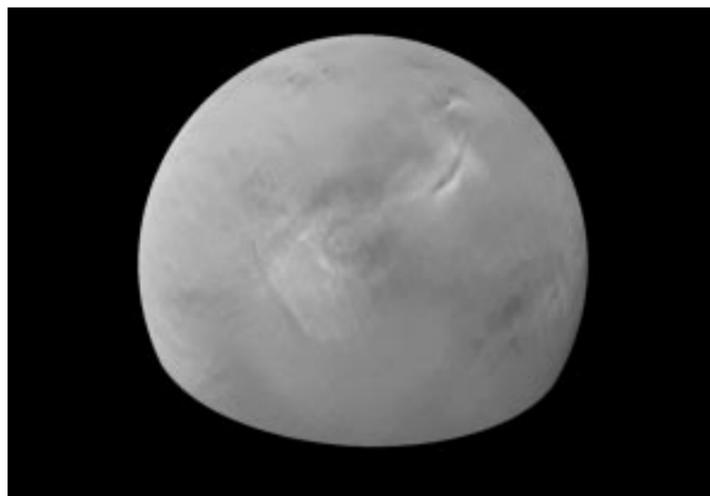
Launch remains targeted for the opening of a 2 1/2-hour window at 1:19 p.m. CDT April 16.

The Neurolab mission will examine the effects of space flight and microgravity on the neurological system, including the brain, spinal cord, peripheral nerves and sensory organs in the human body. The goals of the flight are to conduct basic research in the neurosciences and to increase understanding of neurological and behavioral changes in space.

The planned mission duration is 16 days but mission managers will keep open an option to extend the flight one day if power margins permit. *Columbia* is scheduled to return to KSC on May 2, or May 3 if the extension day is given, about 10:17 a.m. CDT.

Meanwhile, processing of *Discovery* for STS-91, the final shuttle-Mir mission, continues in Orbiter Processing Facility bay 2 at KSC. The Crew Equipment Interface Test is set for this weekend and the completion of main engine installation early next week. STS-91 remains targeted for a launch at 7:05 p.m. CDT May 28.

In OPF bay 1, work to prepare *Endeavour* for the first shuttle station assembly flight continues. STS-88 is marked for a July 9 launch but that date is under review by shuttle managers.



This image was taken by the Global Surveyor spacecraft during the 1997 Martian dust storm. The storm covered an area about the size of the Atlantic Ocean.

NASA completes assembly of new X-ray telescope

Assembly of the world's most powerful X-ray telescope, NASA's Advanced X-ray Astrophysics Facility, was completed last week with the installation of its power-generating twin solar panels. AXAF is scheduled for launch aboard STS-93 in December.

The last major components of the observatory were bolted and pinned into place March 4 at TRW Space and Electronics Group in Redondo Beach, Calif., and pre-launch testing of the fully assembled observatory began March 7.

"Completion of the observatory's assembly process is a big step forward toward launch scheduled for the end of this year," said Fred Wojtalik, manager of the Observatory Projects Office at Marshall Space Flight Center. "With all the major components in place, we are now concentrating on a thorough pre-launch checkout of the observatory."

"We're delighted to reach this major milestone for the program," said Craig Staresinich, TRW's Advanced X-ray Astrophysics Facility program manager. "The entire observatory team has worked hard to get to this point and will continue an exhaustive test program to ensure mission success. We're looking forward to delivering a truly magnificent new space capability to NASA later this summer."

The first pre-launch test of the Advanced X-ray Astrophysics Facility was an acoustic test, which simulated the sound pressure environment inside the space shuttle cargo bay during launch.

A thorough electrical checkout before and after the acoustic test verifies that the observatory and its science instruments can withstand the extreme sound levels and vibrations that accompany launch.

"With 10 times the resolution and 50-100 times the sensitivity of any previous X-ray telescope, this observatory will provide us with a new perspective of our universe," said the project's chief scientist, Dr. Martin Weisskopf, of Marshall. "We'll be able to study sources of X-rays throughout the universe, like colliding galaxies and black holes, many of which are invisible to us now. We may even see the processes that create the elements found here on Earth."

Assembly of the observatory began in 1997 with the arrival of the high resolution mirror assembly at TRW Space and Electronics Group.

In August 1997, the telescope's optical bench was mated with the mirrors, followed by integration of the telescope with the spacecraft in October. In February 1998, the observatory's science instrument module was mated to the top of the telescope. The complete observatory is 45 feet long, has a solar array wing span 64 feet wide, and weighs more than 5 tons.

The Advanced X-ray Astrophysics Facility program is managed by Marshall for the Office of Space Science, NASA Headquarters. The Smithsonian Astrophysical Observatory in Cambridge, Mass., will operate the observatory for NASA.

Mars Pathfinder declared defunct

The Mars Pathfinder team officially declared the spacecraft defunct at 3:21 p.m. JSC time March 10.

Using the high efficiency 34 meter Deep Space Network antenna located in Goldstone, Calif., the team made one last attempt to contact the highly successful probe beginning at 12:51 p.m. The team tried to activate an onboard sequence designed to turn on the primary Pathfinder transmitter. Scientists had to wait for 40 minutes before a response from Pathfinder could be expected.

After an hour, scientists began a 50 minute sweep signal with a command to turn on the primary transmitter on Pathfinder. During this final 40-minute waiting period no contact was heard.

Community News

Space Center Houston hosts

Robotic jousting tough as students compete in regional

By Norm Chaffee

Visitors to Space Center Houston on March 6 and 7 must have initially thought they had accidentally stumbled into a misplaced and belated Winter Olympics event, or into the NCAA Final Four basketball tourney, based on the hectic activity and extraordinary sound and energy levels coming from the large SCH central plaza.

But after they fought their way past the screaming crowds, costumed cheering squads filling the temporary bleachers, cheerleaders, judges, and waiting combatants, there was no dainty Tara Lipinski performing a daring pirouette, nor a towering young athlete dunking a basketball.

There were, however, daring, hulking, and towering mechanical robots pirouetting in a large competition arena, dunking large beach balls into a goal, to the delight of their howling supporters.

Instead of the usually sedate interactive museum-like environment of Space Center Houston, visitors on those days were privileged to watch the southwest regional robotic tournament of the FIRST Foundation. FIRST (For Inspiration and Recognition of Science and Technology) is an educational foundation that promotes the excitement of engineering, science and technology among high school students by sponsoring annual robotics competitions across the country.

This is the seventh year for the national competition, and this year, for the first time, a southwest regional competition was held in Houston to allow teams to try their designs and test their strategies prior to the national competition at Epcot Center, Orlando, Fla., in early April.

Andy Allen, recently retired from the astronaut corps and the president of FIRST, worked with representatives from JSC and SCH to bring the competition to Houston this year.

Twenty one teams from around the country competed, including six teams sponsored by NASA centers—three sponsored by JSC (from Clear Creek ISD; Houston ISD; and Pasadena ISD), two sponsored by

Kennedy Space Center, and one team sponsored by NASA Headquarters. An additional Houston area team from Oak Ridge High School in the Conroe Independent School District, sponsored by Hitachi, also competed.

The teams are typically a consortium of high school students, teachers, and engineers from sponsoring organizations who work together during a seven-week period to conceive, design, build, test, and train with their robot. The rules and requirements are received from FIRST in early January, and the robot entries must be shipped to FIRST for competition by the last week in February—truly a challenging schedule. More than 200 teams will be at the Epcot finals in Florida, including 17 teams sponsored by the various NASA centers.

Walking through the pit areas in the SCH cafeteria where the teams were making last-minute adjustments and trying to repair the wounds from earlier competition rounds, SCH President Richard Allen shook his head and said, "I can't believe that 21 groups can receive the same requirements and rules, and the same box of parts to work with, and come up with such totally different devices."

This year's competition required the remotely controlled robots to pick up beach balls and place them in scoring positions along ladder-like structures radiating from a central column within a 35-foot diameter competition arena. Each of the three "ladders" had scoring positions worth one, two or three points; the placement of beach balls within the hollow central column acted to double the score for each centrally placed ball—thus three balls in the central column doubled the score three times, or by a factor of eight.

At the same time each robot is attempting to score, it can also impede the competing robots from scoring, and of course, must defend itself against attack. A match is two minutes in length and pits three robots against one another. A special rule this year allowed one human player from each team to stand at the arena perimeter and



JSC Photos by Norm Chaffee

Students from around the country participated in the recent FIRST (For Inspiration and Recognition of Science and Technology) regional tournament. Above: Students from the victorious Delphi Industrial Lighting Systems team from Detroit cheer on their team, which used an adroit and quick-acting robot to score quickly and displace the balls of the opposing teams. Left: Students from the Pasadena Independent School District Team, which fell early in the regionals, prepare to drive their robot in the competition.



attempt to throw beach balls into the hollow central column, or to use balls to knock the beach balls of other teams out of scoring positions.

Each match resulted in a hectic two-minute activity of jousting robots, aspiring Michael Jordans on the sidelines attempting to shoot beach balls in the center, and screaming supporters cheering for their teams.

Some robots gripped balls in a pincer; others scooped them up like a bottom-feeding shark. Some robots handled one ball at a time, while many could handle two or three. Most used an extensible manipulator to dunk balls into the central column and to place them on the ladders. However a couple of very clever designs had power roller designs that extruded balls through the sides of the central column and into scoring positions on the ladder

from below.

The JSC/Clear Creek Independent School District team, called the "Marauders," did well in the seeding rounds—being seeded seventh—but was eliminated during the final rounds. The Pasadena team suffered a similar fate. The Houston team reached the quarterfinals; and the Headquarters team, the "Hot-Bots," also was a quarterfinals competitor before being eliminated.

The team from Delphi Industrial Lighting Systems in the Detroit area took first place with an adroit and quick-acting robot, whose strategy was to score quickly and to then displace the balls of the opposing teams and to block them from scoring, an effective strategy.

Second place went to a team from Mountain Home, Arkansas, sponsored by Baxter Health Care Systems, which used the extrusion prin-

ciple to squeeze balls into the central column. Baxter's strategy would have been a winner except for the talented blocking capability of the Delphi team in the final match.

A Honeywell team that could dunk two balls at once also was successful. The 21 teams brought almost 1,000 supporters with them, counting students, teachers, engineers, and parents. Most were specially costumed in accordance with the name of their team. Many had cheerleading squads with them, and all in all it was a festive and exciting occasion for participants and onlookers alike.

The educational activity is designed to bring the excitement of engineering, math and science to an increasing audience of students. The JSC/CCISD team's will be at the national competition next month in Florida.

JSC Safety Alert

Alteration of Flammable Storage Containers

What happened

During a recent facility workplace inspection at JSC, flammable storage lockers were discovered altered. In most cases, a hasp and padlock were installed on the lockers after the original lock on the door failed or the keys to the door were lost.

Outcome

Alteration of the exterior of the cabinet has the potential to void the manufacturers warranty and compromise the fire rating of the cabinet. Many flammable storage cabinets have a double-walled door. The cabinet fire rating will be potentially compromised if any alteration of the cabinet creates a path into the cabinet by way of either a single penetration on a single-walled door or penetration through both walls on a single-walled door. The fire rating of the door is not compromised if the alteration of the cabinet did not penetrate both walls of the door in a double-walled door.

What You Can Do

If the cabinet has been altered, use a two-hour fire-rated caulking to fill the penetration of the screw or bolt so that the penetration through the door is sealed. Call the manufacturer for assistance if the lock on the door of the flammable storage cabinet does not work. Do not alter flammable storage cabinets in any way. The alterations have the potential to cause a fire hazard and may void the fire rating of the cabinet. If you have any further questions, please call the Occupational Safety Office at x34119 or x45931.



Students from Paul Revere Middle School in the Houston Independent School District set up their display, representing various undersea mammals, for the JASON Project. The students built the large stuffed replicas as an extracurricular activity.

JASON surfaces undersea wonders

Thousands of area students converged on NASA to participate in the JASON Project, which is sponsored by JSC's Education and Information Services Branch.

This year's expedition, "JASON IX: Oceans of Earth and Beyond," studied the structure of shallow, mid-water and deep ocean environments. Students investigated a variety of marine communities and related phenomena such as coral reefs, kelp forests, hydrothermal vents, cold seeps, marine snow and exotic deep

sea creatures. Students also learned how recent discoveries in space are providing new clues to the origin of the Earth's oceans and explored the latest evidence of oceans beyond Earth, on Jupiter's moon, Europa.

Experts from Armand Bayou Nature Center, Texas Parks and Wildlife Department, Texas State Aquarium, Sea Center Texas, and Sea Camp at Texas A&M University at Galveston gave presentations to help teachers implement the many JASON IX curriculum investigations.



The pursuit of answers to questions of how the body functions in space is like a search for pieces to a grand puzzle. Many pieces are easily identified and slip readily into place. Others remain elusive.

Occasionally, the placement of a single long-sought piece brings together whole segments, surprising the puzzler with the look of the big picture. And, as the body of knowledge about space life sciences expands, so does the puzzle. The result is an ongoing invitation to continue the search.

Neurolab, the focus of the April flight of *Columbia* on STS-90, is dedicated to the study of the human nervous system. One of the most complex and least understood parts of the body, the nervous system is made up of the brain, spinal cord, peripheral nerves and sensory organs. The nervous system faces major challenges adapting to space flight, as it must adjust to those changing conditions while continuing to control blood pressure, maintain balance, coordinate movements and regulate sleep.

Since Neurolab focuses on basic neuroscience research questions, the mission will provide a unique contribution to the study and treatment of neurological diseases and disorders. While the foremost goal of Neurolab is to expand understanding of how the nervous system develops and functions in space, the research also will increase scientists' knowledge of how this system develops and functions on Earth.

"For NASA, the Neurolab mission, with its domestic and international partners, represents a milestone in the effort to provide scientific researchers with access to space," said Dr. Frank Sulzman, lead scientist for NASA's Life Sciences Division and the originator of the Neurolab

Program. "The mission also signifies the achievement of a certain level of maturity in NASA's life sciences research—a point at which we begin using the unique tool of space to conduct sophisticated experiments. On Neurolab, this tool will provide a way of examining the nervous system that is not possible on Earth. The research subject will experience a unique sensory environment, and we will test exciting theories on how the nervous system responds."

Of all the systems in the human body, the nervous system is the most responsive to the environment, recognizing changes immediately and accommodating them readily. This responsiveness, as it occurs in the studies on Neurolab, will offer new views of how the nervous system works both in space and on the Earth. In addition, the results will form a basis for neuroscience to be carried out on the International Space Station.

Space shuttle managers have tentatively set April 16 as the launch date for Neurolab, with liftoff at 1:19 p.m. JSC time.

Commander Rick Searfoss, Pilot Scott Altman, Mission Specialists Rick Linnehan, Dave Williams and Kay Hire, and Payload Specialists Jay Buckey and Jim Pawelczyk are scheduled to head for Kennedy Space Center and a final dress rehearsal of launch procedures Tuesday. The seven will serve as both subjects and operators of the experiments, using a wide array of biomedical instrumentation, including some instruments and devices developed especially for this mission.

Neurolab also will carry rats, mice, two kinds of fish, snails and crickets into space for its complement of experiments. The investigations, subjects and associated hardware will be housed in a Spacelab module and the shuttle middeck. Experiments will

study the adaptation of the vestibular system and space adaptation syndrome, the adaptation of the central nervous system and the pathways which control the ability to sense location in the absence of gravity, and the effect of microgravity on a developing nervous system. To support more than two weeks of research, the shuttle will be configured with the Extended Duration Orbiter System.

As a result of the data collected over the years on how astronauts adapt to microgravity, researchers are beginning to understand the basics of space physiology. Each piece added to the space life sciences puzzle, however, presents more questions to be answered.

For example, although our basic movements such as walking and balancing were learned with gravity present, how can humans adapt so quickly to function without gravity? How do gravity-sensitive parts of the body such as the inner ear, cardiovascular system and muscles learn to cope without gravity? Why do sleep and biological rhythms change in space? Will inner ears that developed in space function the same as those that developed on Earth?

These questions may be answered by taking measurements of the crew and research animals before, during and after the flight. The experiments have been grouped into eight disciplines. JSC is managing the four human experiment teams—Autonomic Nervous System, Sensory Motor and Performance, Vestibular and Sleep—and a combined total of 11 experiments that will use crew members as subjects. Ames Research Center is managing the four non-human experiment teams—Neuronal Plasticity, Mammalian Development, Aquatic and Neurobiology—with 15 experiments that will study research animals.

Sensory Motor and Performance Team

On Earth, when humans make simple, everyday movements such as pointing or catching a ball, the nervous system takes gravity into account. The brain integrates information from the eyes and inner ear, as well as from nerves in the joints and muscles, to make smooth, accurate movements.

In space, however, the inner ear no longer provides the brain with useful information about "up" or "down" and the nerves in the joints are sensing the movements in weightless limbs.

This means the nervous system must be adapting so astronauts can function effectively. The members of the Sensory Motor and Performance Team want to measure this adaptation and understand how it takes place. They will use a variety of novel techniques to do so on Neurolab.

Using a simple, but effective ball-catching experiment and a Kinelite test apparatus developed by the French Space Agency, scientists will study the ability of the central nervous system to accept and interpret new stimuli while the body is in space.

Another experiment will look at how microgravity alters simple eye-hand coordinated movements like grasping or pointing using the Visuo-Motor Coordination Facility, developed by the Canadian Space Agency.

Yet another experiment will use virtual reality to discover how the body shifts emphasis from inner ear cues to visual cues. The tests will use NASA's Virtual Environment Generator, a head-mounted display, to show computer-generated scenes and track the motion of the head.

Results from the Sensory Motor and Performance experiments are expected to add insight into how the nervous system can find a new balance between information it gathers from the eyes, inner ear and joints that could help in the design of spacecraft and testing patients with neurological diseases.



Autonomic Nervous System Team

The Autonomic Nervous System Team on Neurolab wants to uncover what changes in blood pressure control during space flight lead to the balance problems astronauts encounter after flight.

The symptoms are similar to those experienced when an elderly man stands up quickly after awakening or a fighter pilot forces his plane into a tight turn—they feel dizzy and fall or nearly pass out. In both cases, the cardiovascular system is stressed by gravity, a condition called orthostatic intolerance.

While the autonomic nervous system controls many other functions beside blood pressure, on Neurolab the control of blood pressure is the major focus. To regulate blood pressure, the body has two main tools. It can change the amount

of blood flowing by increasing or decreasing the pumping action of the heart, or it can change the resistance to blood flowing in the blood vessels.

On Neurolab, crew members will carry out a comprehensive set of tests designed to investigate every aspect of autonomic circulatory control, with the overall goal of understanding how it has changed during space flight.

In addition to blood pressure and other basic cardiovascular parameters, blood flow to the brain will be estimated using high-frequency sound waves. Researchers also will monitor nerve signals traveling from the brain to the blood vessels using a small acupuncture-like needle inserted just below the knee.

These measurements will be made

while the nervous system is challenged by a variety of tests. One test stimulates pressure receptors in the neck and chest and measures the responses. Another uses the lower body negative pressure test to place stress on the cardiovascular system similar to that experienced in Earth's gravity.

Taken together, this comprehensive set of measurements should help to solve the puzzle of why astronauts have problems with blood pressure control after space flight, and may also allow doctors to help the 500,000 Americans who suffer from similar symptoms.

Data from Neurolab may provide insight into orthostatic intolerance syndromes such as orthostatic tachycardia and help develop countermeasures.



Sleep Team

Astronauts report an average sleep period of five to six hours compared with a typical period of seven to eight hours on Earth. Some of this may be due to shifting schedules, lack of privacy, confined quarters, and noises and other interruptions.

A clear understanding of the problem is a missing piece in the puzzle of how the body works in space. With the trend toward extended missions and the International Space Station, the issues become compelling.

On Neurolab, investigators will seek both answers and an effective countermeasure through two individual but complementary studies, the overall goal being to improve the quality of sleep for future astronauts.

The team will study the naturally occurring

hormone melatonin to determine its value as a sleep aid and its effects on daytime performance, how changes in respiration alter sleep and how sleep disturbances alter breathing. Astronauts will be given either melatonin or a placebo before sleep. Neither astronauts nor investigators will know who receives the melatonin. Subjects will wear a sleep cap that monitors the electrical impulses from the brain, muscles, eyes and heart.

Changes in respiration may be one of the reasons sleep is disturbed. Crew members will breathe varying gas mixtures while compositions and flow rates are recorded using a gas analyzer. Motions of the rib cage and abdomen, oxygen levels in the blood, arterial blood pressure and heart rate will be recorded.



Vestibular Team

After a shuttle commander brings the spacecraft to a smooth landing, other challenges must be met.

The crew now is feeling gravity for the first time in days and perhaps weeks. They may feel unsteady on their feet and have difficulties with balance. Simple tasks like walking down stairs or turning corners now may be difficult. The crew is experiencing the consequences of a successful adaptation to space. Their symptoms will persist until their vestibular system—the balance organs in the ear and all the connections they make to the eyes, brain and muscles—readapt to Earth.

What changes have taken place in the inner ear? How has the brain learned to ignore some information and reinterpret other signals to allow the astronaut to be productive in space?

These are the questions being asked by the Vestibular Team. To answer these questions, special techniques are necessary. The inner ear resides in the densest bone in the body and does not give up its secrets easily. The investigators will use two noninvasive, but powerful techniques to study the inner ear—centrifugation and eye movement measurement.

Studies on the ground have shown that movements of the eyes accurately reflect what happens in the inner ear. For example, while the body is spinning, the eyes naturally move in a direction opposite to the motion of the head or body. When the eye reaches the extreme of its travel, quick corrective movements bring the eye back; then the eye moves again opposite to the direction of rotation. A similar reaction occurs when the body is tilted.

On Neurolab, crew members acting both as operators and subjects will use an off-axis rotator developed by the European Space Agency to stimulate the vestibular system with both spinning and tilting sensations. Infrared video cameras will capture the eye movements that accompany the spinning. Eye movements will reflect changes in how the vestibular system responds.

Looking at a pattern of stripes moving across the visual field will produce the same type of eye movements that beginning or ending rotation does. In space, the astronauts will look at striped patterns while rotating in the chair. By measuring eye movements, investigators can obtain a measure of how the spatial orientation changes.

"The finding that spatial orientation is reflected in eye movements offers us a powerful tool for testing how spatial orientation changes in space," said Dr. Bernard Cohen of the Mount Sinai School of Medicine. "These studies should help us understand normal balance better and suggest causes for imbalance and falling on Earth."



Neuronal Plasticity Team

Life evolved in Earth's gravitational field, and animals learned tasks such as walking under the force of gravity. When the gravity load is reduced, as it is in space, the nervous system is challenged. The brain must relearn many tasks to compensate for the new environment. The fact that people can function well in space shows that the nervous system can compensate effectively through what is called neuronal plasticity, a phenomenon in which neurons react to changed conditions or using existing connections in different ways. At the cellular level, neuronal plasticity is learning.

On Neurolab, investigators will study neuronal plasticity to understand how balance, daily rhythms and the control of movement change in microgravity. Using rats, investigators will explore how learning occurs in space by measuring changes that take place in the central nervous system. Specifically, they will look at changes in tiny calcium crystals that rest on specialized nerve cells, in the firing patterns of nerve cells in the hippocampus area of rats' brains, and the rats' internal clocks.

Experiments on vestibular adaptation will yield a better understanding of balance disorders that affect more than 90 million Americans.

Neurobiology Team

In many Neurolab experiments, investigators are searching for pieces to one particular space life sciences puzzle—the puzzle of how much of normal development is preprogrammed in genes and how much depends on cues from the environment, such as gravity.

As it turns out, the domestic cricket may be able to help. Crickets have gravity sensors connected to a simple and well-studied nervous system. This means that the development of the gravity sensors and the connections they make to the nervous system can be studied comprehensively both with and without gravity. The crickets develop rapidly during the long flight.

The cricket has another sensory system located next to the gravity receptors. This system is comprised of wind or air current receptors, and there is no reason to expect that these should change without gravity. By comparing the development of the gravity receptors and their connections to the nervous system with the develop-

ment of the wind receptors and their connections, the effect of microgravity should be revealed.

After the flight, the consequences of developing in space will be measured. Crickets roll their heads when tilted, and this reflex is activated by the gravity sensing system. By studying head rolling after the flight, investigators can measure the behavioral consequences of having a nervous system that was built in space.

On orbit, the crickets will be kept in the Botany Experiment Incubator developed by the German Space Agency. The incubator contains a rotating compartment that simulates various levels of gravitational force. Investigators will use BOTEX to compare development of two groups of crickets in early growth stages. One group will develop in microgravity, the other in simulated gravity in an effort to determine how much of normal development is preprogrammed in genetic code and how much can be modified by the environment and experiences.



Mammalian Development Team

A surgeon successfully removes a cataract from one eye of a 50-year-old man who has been blind since birth because of cataracts. When the bandages are removed, an examination reveals that the eye functions acceptably. The patient can see, but he cannot perceive size or distance, recognize faces or understand the colors and shapes he sees.

Neuroscientists are finding increasing evidence that if the nervous system is not exposed to normal forms of stimuli, such as vision, at specific periods during development, the nervous system will not develop properly. Since the patient didn't receive normal stimulation in early childhood, the visual cortex remained underdeveloped and

while the eyes could see, the brain did not get the message.

Experiments on previous shuttle missions indicate that gravity, an ever present stimulus in our Earth environment, also may be essential to normal development. The identification of "sensitive" and "critical" periods of development will add a vital piece to the life sciences puzzle.

On Neurolab, investigators will study the development of muscles, the vestibular system, the cardiovascular system and many parts of the brain using rats and mice at various stages of development.

These studies will look at critical periods in the development of the balance system and hippocampus, whether basic motor

skills such walking or swimming can be learned without gravity, whether the cardiovascular control system develops normally in space and whether the proliferation of nerve cells—a necessary condition for normal development—is affected by gravity.

Just as we have the ability at birth to learn whatever language we are exposed to, we may also have the ability to adapt to whatever gravitational field we experience early in life. These abilities often exist only during a "critical period." Afterward, our potential is limited. Understanding the nature of these critical periods is important in pediatrics. Knowledge of the critical period for developing normal vision already has changed how "lazy eye" is treated in children.



Aquatic Team

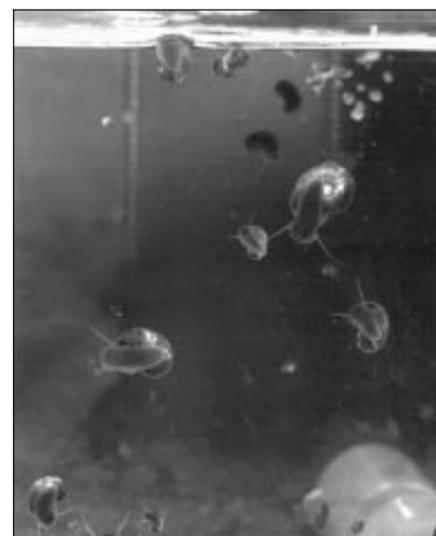
Gravity sensing systems in snails and fish will be used to study questions of how the vestibular system adjusts in microgravity. Investigators will look at physiological changes in the components of gravity sensors, whether signals sent from the inner ear to the brain are altered, and if they are, if behavior changes.

The gravity sensing system is basically the same in fish and humans. In humans, this system is a component of the inner ear. Snails have an even simpler system, which is easier to analyze and develops faster. The gravity sensing component is lined with hair cells that send signals to the brain when they are triggered. The "triggers" are small rock-like particles of calcium carbonate, referred to as statoliths in snails and otoliths in fish and humans. With the tug of gravity, these triggers bend dif-

ferent groups of hair cells, which send orientation signals to the brain.

Investigators will use fresh-water snails and swordtail fish in the early stages of development to study the effects of microgravity on the formation of statoliths and otoliths. The fish and snails will be housed in the Closed Equilibrated Biological Aquatic system developed by the German Space Agency.

Investigators also will look at the Oyster Toadfish to understand changes in the signals sent by the astronauts' inner ears as they adapt to microgravity. Nerve impulse data will be collected and measured in an experiment using a wireless telemetry system devised by the National Space Development Agency of Japan in the Vestibular Function Experiment Unit, an aquatic habitat for saltwater fish.



26 Years Ago at MSC

Carpenter replaces Slayton on MA-7

'Erratic heart' cited as cause for substitution

Reprinted from the March 21, 1962, issue of Space News Roundup.

"I didn't expect to view this assignment with mixed emotions," astronaut Scott Carpenter told newsmen last week. "I hate to be a part of something which is such a great disappointment to 'Deke'."

He referred to Thursday's decision of a civilian medical team not to allow astronaut Donald K. "Deke" Slayton to make the next orbital flight. Carpenter, back-up pilot during astronaut John H. Glenn's orbital flight Feb. 20, was chosen in Slayton's place "because we wanted to use his experience in the Glenn flight immediately," according to Public Affairs Officer John Powers.

Commented Slayton, who learned of the decision late Thursday afternoon: "... I assumed I would go ... You feel the same way you'd feel about anything when you get shot out of the saddle unexpectedly."

Dr. William Douglas, personal physician to the astronauts, told a press conference Friday that Slayton's condition was a "grossly irregular" heart beat, without any known cause. "Many people have this condition," Douglas added.

Commenting on the disparity between the Air Force medical board, which passed Slayton for the flight, and the civilian cardiologists who countermanded the decision, Douglas said it was a "difference of opinion."

Slayton noted that he could tell when the condition occurred, but had

flowed when it was apparent with no ill effect. "I have done everything with it that I can do without it," he said, and added that his cure for it was to "get out and run two or three miles."

"In my opinion it isn't anything unhealthy; it's just like having one blue and one brown eye."

Robert R. Gilruth, director of the Manned Spacecraft Center, said in an earlier press conference in Washington that "Deke" is an extremely competent engineer-test pilot and extremely capable of the mission. In no case has this abnormality interfered with Deke's performance."

Officials emphasized the condition was not due to the centrifuge training, during which it first showed up, or to any other part of the astronaut's training schedule.

As to whether it would clear up later, Dr. Douglas said no, that Slayton would probably have the condition "for the rest of his life."

Carpenter steps into the pilot's shoes with approximately one-third of the preparations of the MA-7 flight completed. Asked about the changes he would make, Carpenter said he "might choose a different name than Deke chose," but thought Deke would "still recognize his flight plan."

Asked one reporter Friday night, "When do you start work?"

"Tomorrow," said Carpenter.

"What about the parade?" the reporter asked.

"I start working tomorrow night," conceded Carpenter.



66-2737



66-2743

Astronaut Scott Carpenter, left, replaced fellow Astronaut Deke Slayton on the Mercury-Atlas 7 mission after doctors discovered an irregular heartbeat during a routine medical examination. Slayton continued to play a vital role in the selection and training of astronaut crews, and eventually flew in space as part of the Apollo-Soyuz Test Project.

Deke still in program, say MSC officials

Manned Spacecraft Center officials emphasized last week that the decision to change pilots in the proposed MA-7 flight because of Astronaut Donald K. Slayton's irregular heartbeat "would not eliminate Deke from the program."

"There are many unknowns still in this program; right now we felt that others who are sounder at the moment might be more appropri-

ate," Public Affairs Officer John Powers told newsmen at a press conference Friday. "When we get to the point where there are not too many unknowns, this will not be a disqualifying condition."

"We expect to keep Deke flying right on down the road."

Later in the week, at ceremonies honoring MSC Director Robert R. Gilruth and the seven astronauts in

Hampton's Darling Memorial Stadium, Powers told the crowd:

"Despite what you may have heard to the contrary, we still have a solid seven-man team of pilots—all red hot for flights."

Said Gilruth himself: "In no case has this abnormally interfered with Deke's performance. My own feeling is that Deke is ... entirely capable of the mission."

JSC employees invited to join NASA Fitness Challenge

All JSC employees are invited to participate in the eighth annual NASA Fitness Challenge, which runs through Aug. 31.

The purpose of the challenge is to promote physical activity with a friendly competition between all NASA centers. Participants who meet the standards for the challenge win a free multi-colored T-shirt.

Participants must keep a record of their activities on a log, which also can be used in applying for a Presidential Sports Award. When an employee has met the requirements in one category, they may send it to the fitness staff at Mail Code AW9. The fitness staff will then help with the rest of the application process.

The following are guidelines for the Presidential Sports Award. Participants may log activities in one or more categories. For maximum benefit, the criteria for each activity should be fulfilled within a four-month period.

Individuals who participate in a variety of categories within a four-month period, but not enough to win an award in any one category, should log their activity under either the Cross Training or Sports/Fitness categories.

Aerobic dance: Participate in a minimum of 50 hours of aerobics, aerobic dance, step aerobics, dance exercise, or similar activity. Credit no more than one hour per day and four hours per week to the total.

Baseball: Play baseball and/or practice baseball skills a minimum of 50 hours with no more than one hour credited to the total per day.

Basketball: Play and/or practice basketball a minimum of 50 hours with no more than two hours credited league or part of an organized team.

Bicycling: On a bicycle with more than five gears, bicycle a minimum of 600 miles with no more than 12 miles per day. On a bicycle with five or fewer gears, bicycle a minimum of

400 miles with no more than eight miles credited per day. On a stationary bicycle, bicycle a minimum of 25 hours with no more than 30 minutes per day.

Cross training: Complete at least one-half of the requirements for two different categories of this program simultaneously. Activities should develop cardiorespiratory endurance, muscle strength and endurance, and flexibility.

Dance: Dance a minimum of 50 hours in ballroom, square, folk, round, pattern, clogging, country western, or dance combination with no more than one and one-half hours per day.

Golf: Play or practice golf a minimum of 100 hours with no more than three hours per day. No motorized carts may be used.

Jogging: Jog a minimum of 125 miles with no more than two and one-half miles per day.

Judo and Karate: Practice judo or

karate skills a minimum of 50 hours with no more than one hour per day.

Rowing: Boat-Row a minimum of 50 miles with no more than one and one-half miles per day. Wherry-Row a minimum of 100 miles with no more than three miles per day. Shell-Row a minimum of 120 miles with no more than three and one-half miles per day.

Running: Run a minimum of 200 miles. Run continuously at least three miles during each outing. No more than five miles may be per day.

Sailing: Sail a minimum of 50 hours (practice and competition) with no more than two and one-half hours per day.

Nordic skiing: Ski a minimum of 150 miles with no more than 10 miles per day.

Softball: Play softball and/or practice softball a minimum of 50 hours with no more than one hour per day.

Sports and fitness: Participate in a minimum of 50 hours in exercise

activities, or in a combination of exercise and sports activities, with no more than one hour per day. Exercise activity may consist of aerobics, aquatics, workout machines, or a combination of any or all of these activities.

Swimming: Swim a minimum of 25 miles with no more than three-fourths of a mile (1,320 yards) per day.

Tennis: Play tennis a minimum of 50 hours with no more than one and one-half hours per day.

Fitness walking: Walk a minimum of 125 miles with no more than two and one-half miles per day. Each walk must be continuous, and the pace must be at least 4 mph.

Volleyball: Play or practice volleyball, or condition for volleyball a minimum of 50 hours with no more than two hours of volleyball or one hour of conditioning per day.

For details, call Larry Wier, Greta Ayers or Anna Callahan at x30301.

Gilruth Center News

Hours: The Gilruth Center is open from 6:30 a.m.-10 p.m. Monday-Thursday, 6:30 a.m.-9 p.m. Friday, and 9 a.m.-2 p.m. Saturday.

Sign up policy: All classes and athletic activities are on a first come, first served basis. Sign up in person at the Gilruth Center and show a yellow Gilruth or weight room badge. Classes tend to fill up two weeks in advance. Payment must be made in full, in exact For more information, call x30304.

Gilruth badges: Required for use of the Gilruth Center. Employees, spouses, eligible dependents, NASA retirees and spouses may apply for photo identification badges from 7:30 a.m.-9 p.m. Monday-Friday; and 9 a.m.-2 p.m. Saturdays. Cost is \$10. Dependents must be between 16 and 23 years old.

Weight safety: Required course for employees wishing to use the Gilruth weight room. The next classes are scheduled for at 8 p.m. May 14 and May 28 (must be on time to receive credit for class). Pre-registration is required. Cost is \$5. Annual weight room use fee is \$90. Additional family members are \$50.

Exercise: Low impact class meets from 5:15 p.m.- 6:15 p.m. Mondays and Wednesdays. Cost \$24.00 for 8 weeks.

Stamp Club: Meets every second and fourth Monday at 7 p.m. in Rm. 216.

Akido: Introduction to Aikido beginning classes start every month. Class meets Tuesday and Wednesday from 5:15 p.m. to 6:15 p.m.

Spring Intercenter Run: Competition will start April 6 and end May 6. Employees may walk or run two miles or 10 kilometers. Time sheet will be at the Gilruth Center. T-shirt orders will be taken at the Recreation Office. Cost: \$6 per shirt.

Ticket Window

The following discount tickets are available for purchase in the Bldg. 11 Exchange Store from 10 a.m.-2 p.m. Monday-Thursday and 9 a.m.-3 p.m. Friday and in the Bldg. 3 Exchange Store from 7 a.m.-4 p.m. Monday - Friday. For more information call x35350 or x30990.

Moody Gardens: Tickets are \$9.75 for two of four events

Space Center Houston: Adults, \$10.25; children (4-11), \$7. JSC civil service employees free.

Movie discounts: General Cinema, \$5.50; AMC Theater, \$4.75; Sony Loew's Theater, \$5.

Astroworld Early Bird Ticket (valid through May 31), \$18.50.

Astroworld One-day admission, \$24.25.

Astroworld Season Pass (valid at all Texas Six Flags Theme Parks and Water World), \$57.75.

Stamps: Book of 20, \$6.40.

JSC Picnic: 11 a.m.-7:30 p.m. April 5 at Astroworld. Tickets are \$23.65.

Metro passes: Tokens and value cards available.

Coming Soon: Sea World, Splashtown Water Park, Schlitterbahn Water Park.

Manager's Message



By John Casper
Director, Safety, Reliability and Quality Assurance

Jerry Glanville, former coach of the Houston Oilers had the quaint habit of leaving extra tickets at the box office for Elvis Presley, just in case the "king" showed up. Somebody tell Glanville to forget the football tickets, but that Elvis lives and has bigger things to do—like helping JSC's Safety, Reliability & Quality Assurance Office push safety.

The occasion was the announcement of the office's reorganization, and instead of a staid, somber, institutional approach, the event took on a party atmosphere complete with "SELVIS" (an appropriate JSC acronym for "Safety Elvis"), a lively "Safety Aires" backup group, and, of course, everybody's green buddy, Seemore Safety. It was, in fact, a restructure celebration.

Who said work couldn't be fun? I was the proud host to some 500-plus employees at the Gilruth Center on March 2, to thank them for work well done and tell them how excited I was to launch our new organization. SR&QA is one of the major team players in the JSC family, and a major priority is to recognize the contributions of those employees who are helping SR&QA become one of the most sought-after offices at the center.

Following an opening in which Safety Elvis, with trademark sideburns, dark glasses, and in an eye-popping green spangled costume, crooned special safety lyrics set to vintage Presley tunes, the audience was reassured that Seemore Safety has not been replaced by Safety Elvis, but the two have teamed up to be our ambassadors of safety at JSC.

One of my primary goals since joining SR&QA has been to ensure that everyone on the team understands who our customers are and how well we meet their requirements. Our first step was to develop a strategic plan identifying who we supported, such as space shuttle, space station and the center director. Our new organization is customer-focused, to help us do a better job of accomplishing SR&QA's purpose—to assure successful space flight and promote a safe and healthy work environment. I'm pleased that we've been receiving positive feedback from our customers that our people are responsive and adding value.

Then, Bill Readdy of the Shuttle Program Development Office, talked about the SR&QA restructure, thanked the employees for doing an outstanding job and spoke optimistically of the new beginning.

This reorganization has been a somewhat involved process and, not surprisingly, the subject of many rumors. So the "Not-quite-ready-for-prime-time players," from among the SR&QA Office, combined laughs with substance in a humorous rendition of how the whole reorganization came about.

The process we followed wasn't as comical, but we do think it was very effective. Rich Dinkel and I picked a team of our future leaders, in whom we have a lot of confidence. The team also included contractors, branch chiefs, and a special panel who talked to customers along the way.

We wanted to avoid the pitfalls of past reorganizations, which had taken as long as two years. One additional caveat we gave the team was that none of them knew which organization they would be leading. This allowed them to focus on developing the best overall plan without building and protecting their own turf. We're extremely proud of the end product. We realized there were many ways to distribute our functions across the organization, and we believe this new organization will be the bridge to carry SR&QA into the 21st Century.

The new SR&QA structure includes the Space Shuttle Division with Mark Erminger as chief and Scott Seyl, assistant; the Space Station Division with Dave Thelen as chief and Bob Alexander, assistant; the Technology Division with Mark Himel as chief and George Jarrell, assistant; the Occupational Safety & Institutional Assurance Division with Stacey Nakamura as chief and Joe Ripma, assistant; the Management Integration Office with Larry Neu as management integration officer; and the ISS Independent Assessment with Hugh Baker as acting manager.

Our goal for this celebration was for our employees to leave with the feeling that management has the deep-rooted goal of making SR&QA work, not for the few, but for everyone at the center, the employees, and, most important of all, the future of the space program.

Zelon to lead Public Affairs; Ward moves to Abbey's staff

Barbara Zelon will be joining JSC as director of the Public Affairs Office next month.

Zelon brings to the center more than 20 years of experience in positions of increasing responsibility in the communications, public affairs and advertising fields. Most recently, she was director of communications and public relations for United Space Alliance.

Zelon earned a bachelor of arts degree in communications/advertising and has extensive experience in media, government, and community relations as well as expertise in marketing, outreach, and educational programs. The appointment is effective April 6.

Douglas K. Ward, who has served as director of Public Affairs since January 1997, will join JSC Director

George Abbey's staff as a special assistant until his planned retirement at the end of the year.

Ward will work with the JSC senior staff to coordinate public appearances and media events surrounding this year's highly visible STS-95 mission with Sen. John Glenn and the STS-93 mission commanded by Eileen Collins and enhancing astronaut appearance effectiveness.

National Space Society hosts viewing party

The Clear Lake area chapter of the National Space Society is planning a party to watch the premier episode of Tom Hanks' "From Earth to the Moon"—the new Home Box Office miniseries.

Veteran Apollo flight controllers are expected to join National Space Society members in watching the show from 6-9:30 p.m. Sunday, April 5 (the show starts at 7 p.m.) on four big screens at Damon's Sports Bar

at the Hobby Airport Radisson hotel. The Radisson Hotel is at 9100 Gulf Freeway.

Free food and soft drinks, as well as a free viewers' guide prepared by the National Space Society and Boeing will be distributed. Door prizes, including maps of the Moon showing the Apollo landing sites, will be awarded. The bar is open to the public, and children may attend if accompanied by a responsible adult.

The National Space Society, founded in 1974, is an independent, nonprofit space advocacy organization headquartered in Washington, D.C. Its 23,000 members and 90 chapters around the world actively promote a space-faring civilization. An interactive viewers guide to the HBO miniseries is available at <http://www.nss.org/apollo>. For more information, call Murray Clark, chapter president, at 367-2227.

Restored leave from furlough needs to be used

JSC's Business Management Directorate reports that, as a result of the 1995 furlough, many employees have restored annual leave that must be taken before Jan. 2, 1999.

Restored annual leave expires two years after the date of restoration; it cannot be reinstated or used after that date. There are no exceptions.

Employees who lost leave in 1996 and had it restored in 1997 must use it by Jan. 1, 2000. Those who lost leave in 1997 and had it restored in 1998 must use it by Jan. 13, 2001.

Employees who have questions regarding their restored annual leave balance and applicable expiration dates should call the Payroll Office at x34832.

Earth Day softball tournament set

Registration is under way for the JSC Earth Day softball tournaments to be played April 18 at the Gilruth softball fields. Men's C and men's D round robin divisions will be held.

Earth Day T-Shirts and Moody Gardens passes will be awarded for first place winners in each division.

The registration fee is \$100 per team or \$60 and a 5-gallon or larger potted tree. To register, submit roster form and entry fee to Gilruth Center by April 10. The contest is limited to the first eight teams to register. For more information, call x33345.

People on the Move

Human Resources reports the following personnel changes as of March 14:

Key Management Assignments

Jim Johnston was selected as chief, Test Branch, Structures and Mechanics Division, Engineering Directorate.

Ken Wong was selected as chief, Structural Mechanical Design and Analysis Branch, Structures and Mechanics Division, Engineering Directorate.

Additions to the Workforce

James Lucero joins the Administration Office at the White Sands Test Facility as a program analyst.

Promotions

Caroline Root was selected as a contracting officer the Engineering Business Management Office.

Vicki Lounge was selected as an administrative officer in the Aircraft Operations Division in the Flight Crew Operations Directorate.

Debbie Schaller was selected as an administrative officer in the Space Shuttle Program Office.

Reassignments Between Directorates

Claudia Pruneda moves from the Space Shuttle Program Office to the Office of the Associate Director.

Kyle Fairchild moves from the Technology Transfer and Commercialization Office to the Mission Operations Directorate.

Rhonda Hyland moves from the Technology Transfer and Commercialization Office to the Engineering Directorate.

Resignations

Amy Black of the Human Resources Office.

Becky Roach of the Business Management Directorate.

Bonnie Black of the Engineering Directorate.

Beatrice Low of the Safety, Reliability, and Quality Assurance Office.

Luis Salomes of the International Space Station Program Office.

Dates & Data

April 1

Spaceland Toastmasters meet: The Spaceland Toastmasters will meet at 7 a.m. April 1 at the House of Prayer Lutheran Church. For details, call George Salazar at x30162.

Communicators meet: The Clear Lake Communicators will meet at 11:30 a.m. April 1. For information and location, contact Henry Duke at 280-4403 or Melissa Sommers at 332-0698.

Spaceteam Toastmasters meet: The Spaceteam Toastmasters will meet at 11:30 a.m. April 1 at United Space Alliance, 600 Gemini. For details, call Chuck Kubricht at 282-3908 or Brian Collins at x35190.

Astronomers meet: The JSC Astronomy Seminar will meet at noon April 1 in Bldg. 31, Rm. 129. An open discussion meeting is planned. For more information, call Al Jackson at x35037.

Warning System Test: The sitewide Employee Warning System will perform its monthly audio test at noon April 1. For more information, call Bob Gaffney at x34249.

April 3

Star Party: Moody Gardens and the JSC Astronomical Society are sponsoring a star party 7 p.m. April 3 at the Moody Gardens Discovery Pyramid. Numerous telescopes will be set up for viewing. The star party is open free of charge to the public. Rain date is April 4.

April 5

HBO Party: The Clear Lake Chapter of the National Space Society is sponsoring a HBO "From the Earth to the Moon" party at 6 p.m. April 5 at Damon's in the Radisson Hotel. The party celebrates the debut of Tom Hank's miniseries "From the Earth to the Moon" exploring America's Apollo space program. Four big-screen televisions will be set up for the event. The party is free of charge and open to the public.

April 6

NSBE meets: The National Society of Black Engineers will meet at 6:30 p.m. April 6 at the School of Technology, Rm. 316, at Texas

Southern University. For details, call Sabra Crawford at 333-7028.

April 7

NPMA meets: The National Property Management Association will meet at 5 p.m. April 7 at Robinette and Doyle Caterers, 216 Kirby in Seabrook. Dinner costs \$14. For details call Sina Hawsey at x36582.

Aero club meets: The Bay Area Aero Club will meet at 7 p.m. April 7 at the Houston Gulf Airport clubhouse at 2750 FM 1266 in League City. For details call Larry Hendrickson at x32050.

April 8

Spaceland Toastmasters meet: The Spaceland Toastmasters will meet at 7 a.m. April 8 at the House of Prayer Lutheran Church. For details, call George Salazar at x30162.

Communicators meet: The Clear Lake Communicators will meet at 11:30 a.m. April 8. For information and location, contact Henry Duke at 280-4403 or Melissa Sommers at 332-0698.

Spaceteam Toastmasters meet:

The Spaceteam Toastmasters will meet at 11:30 a.m. April 8 at United Space Alliance, 600 Gemini. For details, call Chuck Kubricht at 282-3908 or Brian Collins at x35190.

Astronomers meet: The JSC Astronomy Seminar will meet at noon April 8 in Bldg. 31, Rm. 129. An open discussion meeting is planned. For more information, call Al Jackson at x35037.

PSI meets: The Clear Lake/NASA Chapter of Professional Secretaries International will meet at 5:30 p.m. April 8. For information and location, call Elaine Kemp at x30556.

April 9

SSQ meets: The Society for Software Quality will meet at 6:45 p.m. April 9 at the Holiday Inn on NASA Rd. 1. Registration and social begin at 5:30 p.m. with dinner at 6 p.m. The speaker is Sam Boyd, program manager for the JSC safety, reliability and quality assurance contract. The topic will be the Texas Quality Award process, the profiles of past

winners and the values of organizational implementation of principles of the award process.

Airplane club: The MSC Radio Control Airplane Club will meet at 7 p.m. April 9 in the Clear Lake Park building. For details, call Bill Langdoc at x35970.

April 10

Space society meets: The Clear Lake chapter of the National Space Society will meet at 6:30 p.m. April 10 at the Radisson Hotel, 9100 Gulf Fwy. in the Deer Park room. Mark Pestana, manager of Earth and space sciences in the space station payloads office, will speak on "Space Station Lifeboats: Soyuz and Crew Return." For details, call Murray Clark at 367-2227.

Astronomers meet: The JSC Astronomical Society will meet at 7:30 p.m. April 10 at the Center for Advanced Space Studies, 3600 Bay Area Blvd. Rita Karl from the Moody Gardens Discovery Pyramid, will speak on "A Layman's Look at the Hubble Telescope". For more information, call Chuck Shaw at x35416.

NASA Briefs

NASA introduces Web-wide search

NASA has issued the first release of its agencywide World Wide Web search engine, which will allow Internet users to search across hundreds of Web sites at all NASA centers. The first index of NASA documents contains more than 360,000 HTML and text documents. The agency's Web team will continue to develop the search engine, adding new features as it learns more about how the public is using the tool. For a look at the new Internet search engine, visit: <http://www.nasa.gov/search/index.html>

Landsat launch delay

The Landsat-7 Earth science spacecraft will not be launched in July 1998 as planned, due to necessary changes in the design of the electrical power supply hardware for the spacecraft's main instrument. A new target launch date will be set by NASA officials after completion of instrument thermal vacuum tests scheduled for this July. During a series of instrument-level thermal vacuum tests beginning in December 1997, a power supply on the Enhanced Thematic Mapper Plus instrument failed twice. ETM+ is Landsat-7's only science instrument. As a result of the most recent failure in January, both internally redundant power supplies were returned to their manufacturer. Completion of vacuum testing will be delayed while the power supplies are being repaired, which will consequently delay the launch. NASA will now work with its launch contractor, Boeing, on moving the Landsat-7 launch to a mutually agreeable date.

Evidence adds to dinosaur killer theory

Two new impact crater sites in Belize and Mexico add further evidence to the hypothesis that an asteroid or comet collided with Earth about 65 million years ago, subsequently killing off the dinosaurs and many other species on the planet. Centered on the coast of Yucatan, Mexico, the Chicxulub crater is estimated to be about 120 miles in diameter. The impact 65 million years ago kicked up a global cloud of dust and sulfur gases that blocked sunlight from penetrating through the atmosphere and sent Earth into a decade of near-freezing temperatures. The drop in temperature and related environmental effects are thought to have brought about the demise of the dinosaurs and about 75 percent of the other species on Earth.

Two solar studies to measure energy

The Naval Research Laboratory, Washington, DC, and the University of Colorado's Laboratory for Atmospheric and Space Physics in Boulder have been selected by NASA's Office of Earth Science to conduct parallel six-month definition studies of a new small satellite to monitor variations in the amount of radiant solar energy that reaches Earth. The precise measurements, to be obtained by the Total Solar Irradiance Mission, will help scientists better understand the relationship between the Sun's variable energy output and its effects on Earth's climate. NASA has been measuring the total radiative output of the Sun from the unique perspective of space since the late 1970s. The current sensor being used is called the Active Cavity Radiometer Irradiance Monitor.

JSC seeks volunteers for Trash Bash

JSC is looking for volunteers to join the fifth annual Trash Bash at 8:30 a.m. March 28 on the Seabrook side of the Kemah bridge.

Every year, thousands of volunteers gather along the Texas waterways to do their part in cleaning up the environment and participate in the largest statewide event to educate the public about the importance of our water resources.

Thousands of Houston/Galveston area volunteers join forces on March 28th for the fifth annual River, Lakes,

Bays 'N Bayous Trash Bash. Volunteers from around Houston will clean up the waterways at 11 selected sites from Lake Conroe to Galveston. JSC's team of volunteers will clean up a section of Clear Lake near the Kemah Bridge.

Sponsored by local and national firms, the annual Trash Bash is a program of the Texas Natural Resource Conservation Commission. Gulf Coast Waste Disposal Authority is regional coordinator of the annual event.

"We are trying to direct the public's attention to the importance our water holds for us in this watershed," said Lori Roussel, Gulf Coast Waste Disposal Authority's assistant to the general manager.

Everyone has a part to play with using the water, so we all should play a part with cleaning it.

Volunteers should meet at 8:30 a.m. on March 28 at the Boat Ramp on the north (Seabrook) side of the Kemah Bridge on Highway 146 at the 10th Street/Fay Street exit off

146, rain or shine, and should remember to wear appropriate clothing and footwear.

The clean-up is from 9-11:30 a.m. and the party is from 11:30-1:30 p.m. The party includes free lunch, entertainment, souvenirs and door prizes. Expect a large crowd, NASA is by no means the only participant.

Employees interested in making a difference and taking control of our environment should register for the 1998 Trash Bash by calling Sean Keprta at x45931.



JSC Photo by Kevin Koepke

NEW OUTFIT—Television personality Vanna White, famous for her wardrobe and letter turning on the syndicated show "Wheel of Fortune," tries on a new outfit during a visit to JSC on March 7. With help from Astronaut Jim Reilly, White dons an extravehicular mobility unit space suit while here to record promotional spots for the show's upcoming visit to the Houston area.

X-38 testing success attributed to center, agency teamwork

(Continued from Page 1)

tion to the X-38.

"We made a real partnership between JSC and Dryden Flight Research Center," he said. "We were able to merge the experimental flight test culture of DFRC with the human space flight culture of JSC. The result was a successful fast-paced program that is proving all of the critical technologies for the crew return vehicle."

"With Johnson and Dryden employees working as a team, we were able to design, outfit and test the vehicle," said Bob Baron, Dryden X-38 project manager. "Using

existing NASA infrastructure, such as the Johnson and Dryden control rooms and the B-52 mothership, has provided considerable cost and schedule savings in the development of this prototype X-38 vehicle."

Once operational, the X-38 will become the first new human spacecraft designed to return humans from orbit in more than 20 years, and it is being developed at a fraction of the cost of past human space vehicles. The primary application of the new spacecraft would be as an International Space Station "lifeboat," but the project also aims at developing a design that could be

easily modified for other uses, such as a possible joint U.S. and international human spacecraft that could be launched on expendable rockets as well as the space shuttle.

The European Space Agency is cooperating with NASA in the current development work, supplying several components for the planned space test vehicle.

The X-38 is being developed with an unprecedented eye toward efficiency, taking advantage of available equipment and already-developed technology for as much as 80 percent of the spacecraft's design. The design uses a lifting body con-

cept originally developed by the Air Force X-24A project in the mid-1970s.

Following the jettison of a deorbit engine module, the X-38 would glide from orbit unpowered like the Space Shuttle and then use the steerable parafoil parachute for its final descent to landing.

In the early years of the International Space Station, a Russian Soyuz spacecraft will be attached to the station as a crew return vehicle. But, as the size of the station crew increases, a return vehicle like the X-38, that can accommodate up to seven passengers, will be needed.

NNews latest JSC information tool

(Continued from Page 1)

news. All users will receive safety and centerwide information.

An emergency channel also will help communicate emergency information. This feature is in the hands of JSC's Emergency Operations Center, and will complement the emergency broadcast loudspeaker system that spans the campus.

Soon, NNews will be distributed automatically to all workstations via the network. For now, the program is available for employees to download to their workstations from the Information Systems Directorate web page at the following address: <http://www4.jsc.nasa.gov/org/GA/nnews/>

"A more prepared and safer JSC is possible with widespread availability of NNews and the Emergency Broadcast System feature for workstations," said Information Systems Director Dick Thorson.

"Most JSC workers are always busy, with little to no idle time. There are, however, moments between jobs, meetings, telephone calls, lunch or reading. With the NNews screen saver, users can be apprised of the latest JSC and NASA related information without having to hunt," Thor-

son said. "They need only glance at a screen to be more informed and potentially safer. NNews can deliver information on demand and also fill the few gaps in the day conveying safety information and JSC News. Workstations become more productive and people better informed with NNews. As a screen saver NNews can inform anyone within sight of the workstation who might be passing by or waiting for a meeting."

NNews is available for any office to use for exchanging or posting information. NNews providers use a simple "one page at a time" editor in order to publish. The process of creating and publishing a screen for viewing takes only minutes. No Web site is required, but NNews may be integrated with Web site information.

Division-level organizations that need the NNews distribution method should select a prime and alternate employee as NNews providers, then submit a Service Request.

Robert Anderson will serve as administrator of the NNews system for ISD's Information Technology Office. For more details, contact Anderson (robert.t.anderson1@jsc.nasa.gov or x38803)

National Security Agency to test computer security

NASA, including JSC, soon will be the subject of computer security tests being mounted by the National Security Agency.

The tests, being undertaken at the request of the General Accounting Office, will evaluate the agency's government-funded computer systems' ability to resist penetration attacks.

"The GAO asked NSA to examine computer security at several agencies, including NASA," said JSC Chief Information Officer Jack Garman. "The tests at JSC will probably focus on mission and other critical systems, but any JSC system may be subject to testing. We also expect that NSA will monitor systems and network traffic during these tests."

The National Security Agency's testing protocols require that JSC and contractor users be made aware that tests will be conducted and that simply using these systems during the tests constitutes consent to be monitored for security purposes. This article is intended to serve as that official notification to employees.

"This is a good opportunity to remind the JSC user community of JSC policies regarding privacy and proper use of Government computer resources," Garman said.

This policy, which indicates that users of Government systems have no inherent expectation of privacy, is stated in both the JSC Information Technology Manual, JPD 2800.2, and in JSC Announcement-96-072, which is available on the JSC Web pages at: <http://www4.jsc.nasa.gov/org/jsc/internal/announcements/#1996>

The National Security Agency testing is expected to last several weeks. Further information on NSA penetration testing is posted on the JSC Internal Home Page at <http://www4.jsc.nasa.gov>.



The Roundup is an official publication of the National Aeronautics and Space Administration, Lyndon B. Johnson Space Center, Houston, Texas, and is published every other Friday by the Public Affairs Office for all space center employees. Deadline for the submission of articles is Friday, three weeks before the desired date of publication.

The Roundup office is in Bldg. 2, Rm. 181. The mail code is AP3. The main Roundup telephone number is x38648, and the fax number is x45165. Electronic mail messages may be directed to:

kelly.o.humphries1@jsc.nasa.gov or leslie.eaton1@jsc.nasa.gov.

Editor Kelly Humphries
Associate Editor Leslie Eaton

Retirees should submit change of address notices to the distribution group at Mail Code BT552 or call Ignacia Ramirez at 281-483-6161.

Leak check verifies integrity of Node 1

(Continued from Page 1)

evidence of helium leakage from the node. The test required cooperation and support by workers from both NASA and its prime station contractor, Boeing, at JSC, KSC and Marshall Space Flight Center.

"The smooth conduct of the test and the successful results speak volumes about professionalism and the high quality products of the engineering team here at JSC, in Huntsville and at KSC," Bastedo said. "In addition, we can have great confidence in the workmanship that has been performed to date on the Node."

With the test complete, the node will be removed from the payload canister and returned to the element rotation stand for completion of the Cargo Element Integrated Test, which ultimately will verify the node's functional readiness for launch.

Later, in the Operations and Checkout Bldg., other elements of the station will be leak checked in an altitude chamber built by NASA for the Apollo program. Modifications being made to the chamber will accommodate these components.